

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method for generating mid and long wavelength infrared radiation, comprising the step of:

pumping a tunable optical parametric oscillator with the output of a laser-pumped optical parametric oscillator pumped with seeded pumping energy, the laser-pumped optical parametric oscillator having a stable resonator and an output beam of a sufficiently narrow line width to enable production of the mid and long wavelengths, said line width being less than 5 nanometers.

2. (Cancel)

3. (Currently amended) The method of Claim 2, wherein the pumping laser-pumped optical parametric oscillator is non-colinearly phase matched to provide the narrow line width beam.

4. (Currently amended) The method of Claim 3, and further including the step of pumping the pumping laser-pumped optical parametric oscillator with a narrow line width source of pumping energy.

5. (Cancel)

6. (Currently amended) The method of Claim 4, and further including wherein the step of seeding the pumping energy with for the laser-pumped optical parametric oscillator includes a

6. (Currently amended) The method of Claim 4, ~~and further including wherein~~ the step of seeding the pumping energy ~~with~~ for the laser-pumped optical parametric oscillator includes a seed having energy corresponding in wavelength to one of the wavelengths at which the pumping laser-pumped optical parametric oscillator lases.

7. (Currently amended) The method of Claim 6, wherein the one wavelength is that associated with the signal of the pumping laser-pumped optical parametric oscillator.

8. (Previously amended) The method of Claim 1, wherein the output that pumps the tunable optical parametric oscillator includes 5 micron energy.

9. (Original) The method of Claim 8, wherein the line width of the 5 micron energy that pumps the tunable optical parametric oscillator is less than 5 nanometers.

10. (Original) The method of Claim 1, wherein the tunable optical parametric oscillator is tunable between 5 and 20 microns.

11. (Currently amended) A method of providing sufficient pumping energy to pump a tunable optical parametric oscillator so that it is tunable to produce an output between 5 and 20 microns, comprising the step of:

pumping the tunable optical parametric oscillator with an output from a pumping laser-pumped optical parametric oscillator that is non-colinearly phase matched, has a stable resonator

parametric oscillator being of a line width less than 5-nanometers nanometers to effectively pump the tunable optical parametric oscillator.

12. (Canceled)

13. (Currently amended) The method of Claim 11, wherein the tunable optical parametric oscillator includes a CdGeAs₂ nonlinear crystal, wherein the pumping laser-pumped optical parametric oscillator includes a ZGP nonlinear crystal, and wherein the seeding pumping energy is from an HeNe 3.39 micron source.

14. (Currently amended) A system for generating coherent infrared energy in a band from 5-20 microns, comprising:

a tunable optical parametric oscillator having an output tunable from 5-20 microns; and,
A pumping a laser-pumped optical parametric oscillator having a stable resonator, a pumping laser, and a seeding source coupled to the output of said pumping laser, said laser-pumped optical parametric oscillator having an output beam coupled to said tunable optical parametric oscillator and ~~of~~ a line width less than 5 nanometers to effectively pump said tunable optical parametric oscillator.

15. (Currently amended) The system of Claim 14, wherein said pumping laser-pumped optical parametric oscillator is non-collinearly phase matched.

16. (Cancel)

17. (Currently amended) The system of Claim-16 14, wherein said tunable optical parametric oscillator includes a CdGeAs₂ nonlinear crystal and wherein said pumping laser-pumped optical parametric oscillator includes a ZGP nonlinear crystal.

18. (Currently amended) The system of Claim-71 17, wherein said seeded pumping source includes a HeNe laser.

19. (Original) The system of Claim 18, wherein said seeded pumping seeding source includes a Ho:YLF laser.

20. (Currently amended) A method for generating mid and long wavelength infrared radiation, comprising the step of:
pumping a tunable optical parametric oscillator with the pumping energy from a pumping laser-pumped optical parametric oscillator pumped by a pumping laser having an output seeded with the output of a seeding laser, the laser-pumped optical parametric oscillator having a stable resonator and having an output of a sufficiently narrow line width to enable production of the mid and long wavelengths, the narrow line width established by seeding the pumping energy to the laser-pumped optical parametric oscillator with energy corresponding in wavelength to one of the wavelengths at which the pumping laser-pumped optical parametric oscillator lases.

21. (Cancel)

22. (Currently amended) The method of Claim 21, wherein the pumping laser-pumped optical parametric oscillator is non-colinearly phase matched.

23. (Currently amended) The method of Claim 22, and further including the step of pumping the pumping laser-pumped optical parametric oscillator with a narrow line width source of pumping energy.

24. (Previously added) The method of Claim 23, wherein the line width of the source of pumping energy is less than 5 nanometers.

25. (Currently amended) The method of Claim 20, wherein the one wavelength is that associated with the signal of the pumping laser-pumped optical parametric oscillator.

26. (Previously added) The method of Claim 20, wherein the tunable optical parametric oscillator is pumpable with 5-micron energy.

27. (Previously added) The method of Claim 26, wherein the line width of the 5 micron energy that pumps the tunable optical parametric oscillator is less than 5 nanometers.

28. (Previously added) The method of Claim 20, wherein the tunable optical parametric oscillator is tunable between 5 and 20 microns.

29. (New) A method of providing sufficient pumping energy to pump a tunable optical parametric oscillator so that it is tunable to produce an output between 5 and 20 microns, comprising the step of:

pumping the tunable optical parametric oscillator with an output from a pumping optical parametric oscillator that is non-colinearly phase-matched and is pumped with seeded pumping energy, the output of the pumping optical parametric oscillator being of a line width less than 5 nanometers to effectively pump the tunable optical parametric oscillator, the tunable optical parametric oscillator including a CdGeAs₂ non-linear crystal, the pumping optical parametric oscillator including a ZGP non-linear crystal, the seeding pumping energy being from an HeNe 3.39-micron source.

30. (New) A system for generating coherent infrared energy in a band from 5-20 microns, comprising:

a tunable optical parametric oscillator including a CdGeAs₂ non-linear crystal having an output from 5-20 microns; and,

a pumping optical parametric oscillator including a ZGP non-linear crystal having an output beam coupled to said tunable optical parametric oscillator and of a line width less than 5 nanometers to effectively pump said tunable optical parametric oscillator.

31. (New) The system of Claim 30, wherein said seeded pumping energy includes energy from a source that includes a HeNe laser.

32. (New) The system of Claim 31, wherein said seeded pumping energy includes energy from a Ho:YLF laser.